## UNITED STATES PATENT AND TRADEMARK OFFICE CERTIFICATE OF CORRECTION

PATENT NO. : 6,897,517

Page 1 of 1

APPLICATION NO.

: 10/603426

ISSUE DATE
INVENTOR(S)

: May 24, 2005 : Van Houdt et al.

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

On page 1, at section (73) Assignees, after "Infineon" please insert -- Technologies --.

On page 1, at section (73) Assignees, please delete "Munich" and insert therefore -- Neubiberg--.

10909161 031811

MAILING ADDRESS OF SENDER:

John M. Carson KNOBBE, MARTENS, OLSON & BEAR, LLP 2040 Main Street, 14<sup>th</sup> Floor Irvine, California 92614

DOCKET NO. IMEC279.001AUS

(12) United States Patent Van Houdt et al.

(10) Patent No.: (45) Date of Patent: US 6.897,517 B2 May 24, 2005

(54) MULTIBIT NON-VOLATILE MEMORY AND METHOD

FOREIGN PATENT DOCUMENTS (75) Inventors: Jan Van Houdt, Bekkevoort (BE): Luc

Haspeslagh, Lubbeek-Linder (BE)

(73) Assignees: Interuniversitair Microelektronica Centrum (IMEC), Leuven (BE): Infineon AG, Munich (DE)

(\*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.; 10/603,426

(56)

(22) Filed: Inn. 24, 2003

Prior Publication Data (65) US 2004/0057264 A1 Mar. 25, 2004

Related U.S. Application Data

Provisional application No. 60/391,565, filed on Jun. 24,

(51) Int. Cl.7 ...... H01L 29/788

.. 257/315; 257/239; 257/261; (52) U.S. Cl. ... 257/316; 257/317; 257/320; 257/321; 438/201; 438/211; 438/216; 438/241; 438/257; 438/260

(58) Field of Search .. 257/239, 261, 257/298, 315-326; 438/201, 211, 216, 241, 257-258, 260-266, 591, 593

References Cited

U.S. PATENT DOCUMENTS

12/1988 Wu et al. 4,794,565 A 5,278,439 A 1/1994 Ma et al. 5,280,446 A 1/1994 Ma et al. 5,284,784 A 2/1994 Manley 8/1994 Yamauchi 5.338.952 A 2/1995 Fukumoto 5 394 360 A 5,538,811 A 7/1996 Kanbara et al. .... 438/258 5.587,332 A \* 12/1996 Chang et al. 6,044,015 A 3/2000 Van Houdt et al.

4/2002 Ogura et al.

6/2003 Haspeslagh 6 580 120 B2 1/2002 Widdershoven et al 2002/0005545 A1

1 096 572 AI 5/2001 EP

OTHER PUBLICATIONS

US 5,841,697, 11/1998, Van Houdt et al. (withdrawn) Esquivel, et al., "High density contactless, self aligned EPROM cell array technology", IEDM Tech. Dig., pp. 592-595, (1986). Hayashi, et al., "Twin MONOS cell with dual control gates", IEEE, presented at the 2000 Symposium on VLSI Technol-

ogy Digest of Technical Papers, pp. 122-123, (2000). Microlithography, Science and Technology, Sheats, et al., Eds., Marcel Dekker, Inc., New York, New York, pp. 515-565 and 615-644, (1998). Miyawaki, et al., "A new crasing and row decoding scheme

for low supply voltage operation 16-Mb/64-Mb flash memories", IEEE Journal of Solid-State Circuits, vol. 27, No. 4, pp. 583-588, (Apr. 1992).

(Continued)

Primary Examiner-David Nelms Assistant Examiner-Andy Huynh

(74) Attorney, Agent, or Firm-Knobbe Martens Olson & Bear, LLP

ABSTRACT

A memory is described having a semiconductor substrate of a first conductivity type, a first and a second junction region of a second conductivity type, whereby said first and said second junction region are part of respectively a first and a second bitline. A select gate is provided which is part of a wordline running perpendicular to said first and said second bitline.

Read, write and erase functions for each cell make use of only two polysilicon layers which simplifies manufacture and each memory cell has at least two locations for storing a charge representing at least one bit.

13 Claims, 21 Drawing Sheets

